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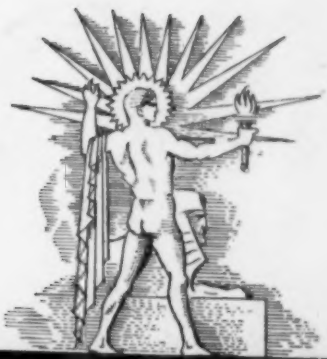
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



MAY 2, 1931

With Folded Hands Before the City's God

See Page 281

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XIX *No. 525*

The Weekly Summary of Current Science

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DO YOU KNOW THAT

There are more than 100 species of snakes in the United States, of which number only 17 are poisonous.

Samuel F. Morse, inventor of the telegraph, was an artist and painted many noted men of his time.

There has been an increase in automobile deaths every year since 1904, the first year in which records were kept, the National Safety Council reports.

A Greek palace of the fifth century B. C. has been excavated at Alexandretta, Syria, with the recovery of statues of Eros, Mercury and other gods, and various ornaments.

Small dogs tend to have a body temperature slightly higher than big dogs.

The British Museum has a Chaldean tablet recording a solar eclipse of 1062 B. C.

Polo was played almost two thousand years ago by nomad horsemen in central Asia.

"Bumpy" air shocks an airplane harder than the bumps of fast landing, tests show.

Tuberculosis takes its greatest toll between the ages of 15 and 25.

A drought that was almost continuous from 1896 to 1902 was experienced by New South Wales and Queensland.

A talking film on the Indian sign language is being made by the Government, with Maj. Gen. Hugh L. Scott as the film lecturer who explains the signs.

New kinds of soybeans have been brought to the United States by a government plant explorer who spent two years in the Orient.

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SAVE OUR WILD FLOWERS

By Dr. Edgar T. Wherry, professor of plant ecology at the University of Pennsylvania, who has crisscrossed the country for thousands of miles studying the American flora

Friday, May 8, at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSIOLOGY

Condition of Brain Jelly Said to be Cause of Insanity

Theory Holds That Thick and Thin Brain Colloid Cause Two Types of Madness That Can be Treated With Drugs

WHETHER you are sane or crazy depends on how solid your brain jelly is. If it is too thick, you will have one type of madness; if it is too thin you will be afflicted with a different kind. "Thin-brained" insanity can be treated with drugs that make the brain jelly thicker, such as coffee or alcohol. "Thick-brained" insanity will yield to drugs with the opposite effect, such as bromides.

That is, in very much simplified language, the theory of insanity and its possible treatment presented before the National Academy of Sciences in Washington this week by Prof. Wilder D. Bancroft of Cornell University and Dr. G. Holmes Richter, National Research Council fellow in chemistry.

In more scientific terms, the living portion of the brain and nerves, the physical substratum of mental and nervous effort, is a colloid. Familiar household examples of colloids are jellies, the white of eggs, mayonnaise dressing. The family resemblance of these to brain-stuff will be recognized by any one who has ever handled calves' brains from the butcher shop.

Proper Drugs Reverse Process

The theory of Prof. Bancroft and Dr. Richter is that the colloids of the sane brain are at a certain state of coagulation, or "thickness." Anything that tends to make them more coagulated brings on irritability, then insanity, then sleep or insensibility, finally death. This fatal chain can be combated by the use of drugs that reverse the coagulating process. Anything that tends to make the brain colloids more disperse, or "thinner," also brings on insanity, but of a different type, and may result in death. Patients suffering from the latter type of disorder can be benefited by treatment with coagulating drugs, which include mild ones like tea and coffee as well as more potent things like morphine, cocaine, atropine and hashish.

"Of course treatments of this sort will not restore brain tissue which has been eaten away by syphilis or anything of that sort," Prof. Bancroft says, "but they will enable the physician to get the coagulated tissue back into a more nearly normal state.

"Over-doses of a dispersing agent should give a normal person a dispersion type of insanity, while over-doses of a coagulating agent should give the coagulation type of insanity."

Science News Letter, May 2, 1931

ASTRONOMY-PHYSICS

Atoms Combine in Sun's Atmosphere

NOT ALL chemical compounds break up in the intense heat of the sun's atmosphere, Prof. Henry Norris Russell of Princeton University told the National Academy of Sciences in Washington this week.

It was formerly supposed that no chemical molecules could form in the sun. Fourteen different compounds have now been discovered there, six in the photosphere or outer layer and eight more above the darker sunspots.

Hydrogen and oxygen occur most frequently in these compounds, hydrogen being the most abundant constituent of star atmospheres. As the behavior of the substances is well known on the earth the extent of their dissociation in the sun and stars can be calculated with some accuracy. The results are in good agreement with observation.

Science News Letter, May 2, 1931

PHOTOGRAPHY

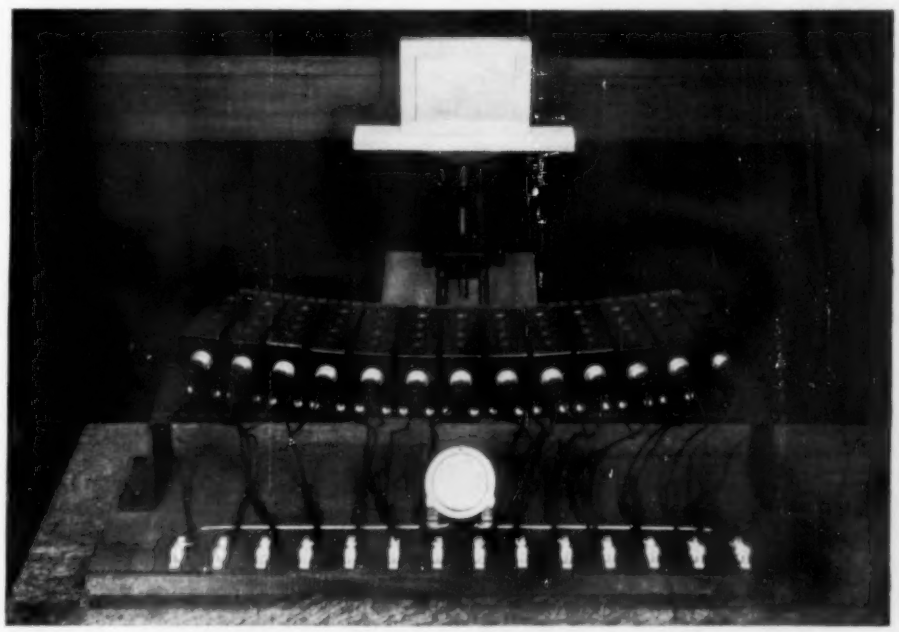
300 Projectors Needed To Show Depth Pictures

PICTURES projected on a screen made of tiny glass rods give a strong illusion of depth or relief without the use of spectacles or rotating disks before the eyes of the observer, as has been necessary in previous inventions.

This model pictured here was made by the inventor, Dr. Herbert E. Ives of the Bell Telephone Laboratories. It throws pictures made by 13 different cameras on the specially constructed screen. Rods or prisms of glass, one hundredth of an inch in diameter, or similar surfaces of celluloid, run up and down the surface of the screen.

The method is not yet ready for moving picture use as a full size screen would require a battery of 300 cameras to take the pictures and 300 projectors in the auditorium.

Science News Letter, May 2, 1931



MODEL PROJECTORS OF PICTURES IN RELIEF

The thirteen projectors described in the accompanying article are circled in front of the screen upon which the picture is thrown.

MEDICINE

Finds Men Better Than Women As Blood Donors

MEN CAN give blood for lifesaving transfusion more easily than women. Drs. Harold W. Jones, Herbert Widing and Lyle Nelson of Philadelphia have just reported to the American Medical Association.

The best type of donor is a man between 20 and 40 years of age, weighing 150 pounds or more, and of erect, compact stature, they found. A fat donor does not stand loss of blood as well as the robust, wiry type.

Dr. Jones and his associates made a detailed study of 50 donors who gave blood in 175 transfusions, to determine the effect on the donors' health of repeated losses of blood.

Donors lost from one-half to one pound in weight immediately following the transfusion. However, all but two of the men who gave blood more than once subsequently gained in weight, the gain varying from one to 13 pounds. Many of the donors found their general health improved and felt more able and eager to attend to their usual duties. Thirty of the fifty donors weighed more than 160 pounds.

Science News Letter, May 2, 1931

PHYSICS

Rare Element Gives New Kind of Light

RODS of quartz heated in the Bunsen burner have been made to send out a new kind of light, the meeting in Washington of the National Academy of Sciences was told this week.

The quartz, in which a compound of the rare metal neodymium had been dissolved, was prepared by Prof. R. W. Wood of the Johns Hopkins University. When heated the rods give a light whose rainbow or spectrum does not include all the colors but is crossed by dark bands.

A white-hot, incandescent wire, like those of tungsten used in the electric lamp, gives white light in which none of the possible colors is missing. The neodymium, however, has the unique property of sending out only special vibrations of its own. Light passed through cold neodymium or other rare earth compounds has these same colors removed from it. Only rare earth elements show this peculiar behavior.

Science News Letter, May 2, 1931

A PREHISTORIC ELEPHANT'S TOOTH WITH ITS ENAMEL FOLDS

ANTHROPOLOGY

Age of Prehistoric Man Measured by Elephant Teeth

NEW ACCURACY in the dating of the time any individual prehistoric man lived can be attained if the teeth of an extinct elephant species can be found buried with or near his remains. At the meeting of the American Philosophical Society in Philadelphia last week, Prof. Henry Fairfield Osborn, president of the American Museum of Natural History, told of a method he has developed for getting recent geological dates by means of measuring the length of the complex enamel folds in elephants' teeth.

The new method of enamel-measuring, which Prof. Osborn calls "ganometric," arose as the result of studies on the much-debated question of the ages of the Ape-Man of Trinil, Java, and the Dawn Man of Piltdown, England. In this work he had as associates Prof. W. C. Dietrich of Berlin and Prof. Wilhelm Freudenberg of Heidelberg. Teeth of two species of extinct elephants found associated with these two famous skulls indicated by their comparative degrees of development an unexpected reversal of their relative ages. The elephant teeth found near the more highly developed Piltdown skull were of a more primitive type, with fewer inches of enamel foldings, than were the teeth found near the site of the famous Trinil skull in Java. Prof. Osborn therefore concludes that the Piltdown skull is much the older, and that the very primitive character of the Trinil skull is to be accounted for as a survival of a lower type in a tropical country where life was easy.

After the work on the two skulls was concluded, Prof. Osborn devoted considerable time to an intensive study of a large collection of fossil elephant teeth, and found that there is a direct relation between the footage of enamel foldings and the geologic age of the specimen. Elephants that the Piltdown man knew had teeth with about a yard of enamel foldings packed into their surfaces, while the elephants that Cro-Magnon hunters slew had about six yards of enamel foldings per tooth.

Prof. Osborn believes that the rate of enamel development in a given evolutionary line in elephants was uniform, so that eventually it may become possible to get a quite accurate estimate of the age of a specimen simply by measuring the number of inches of these foldings.

Science News Letter, May 2, 1931

PUBLIC HEALTH

Frequent Revolutions Chief Cause of Poor Health

REVOLUTIONS and political disturbances are the chief causes of the poor health conditions in Latin American countries today, declared Dr. C. E. Paz Soldan, professor of hygiene at the University of San Marcos, Lima, Peru, at the Pan-American Conference of directors of health in Washington.

"When revolution occurs, the health officer is knocked out or fired," Dr. Soldan said. A new health officer is appointed and the public health work must begin all over again. This makes it impossible to have any continuous program of even the most elemental public health work as we understand it in the United States.

Science News Letter, May 2, 1931

METEOROLOGY

Weather Cycles Make Possible 25-Year Rainfall Predictions

Study of Thousands of Years of Climate History Reveals Long Cycle Fluctuating Under Influence of Sunspots

WEATHER cycles, first observed by noting the years when good and bad wines were made, will tell the flow of the Colorado River during the next ten or twenty years, A. F. Gorton of the Scripps Institution of Oceanography, LaJolla, Calif., told the American Geophysical Union in Washington this week.

For huge water-storage projects like the Boulder Dam it is becoming increasingly necessary to be able to forecast far in advance, and this, said Mr. Gorton, is promised by the cycle theory of weather.

The Brueckner cycle of 22 years has been detected in recent years in records of rainfall, river flow, and lake levels, in spite of the fragmentary and inaccurate data available.

Several thousand years of climate history have now been written from observations of eccentricities of the weather before the thermometer and rain gauge were introduced. Floods, droughts, severe winters, prolonged freezing of harbors, rivers, lakes and seas and the devastation of hot, dry summers have been noted by people throughout history. From this dramatic if slender narrative the essential correctness of Brueckner's 22-year period has been demonstrated successfully.

"Coupled with this history of recurring anomalies of the weather," said Mr. Gorton, "we have vague but persistent evidence of a gradual drying-up or dessication of climate in certain regions, such as Mongolia, Tibet, Iraq, Northern Africa, Peru, Mexico, and in our own country, New Mexico at the site of the cliff dwellers. In most cases the evidence of dessication is based on lower lake levels.

"It is possible to establish the existence of certain cycles by means of official weather bureau records of rainfall and temperature, although in no case are they older than 60 years. Also fairly accurate observations have been made in the older cities of the east since revolutionary times."

Rainfall records from both the east and the west coasts of this country show the Brueckner cycle though the crests of the curve or years of maximum rain are completely out of step. The floods of the Murray River in Australia show the same periodicity but there is a six-year difference between southern Australia and southern California.

Rainfall and stream flow on the west coast show other regularities, of two to three years, five and one-half years, and eleven years. All of these cycles are deducible from the periods of fluctuation of sunspot numbers and are simply related to the longer Brueckner cycle.

From facts of this kind it will be possible to make forecasts of the trend of precipitation up to 25 years. The value of such predictions to agricultural, economic and financial interests, not to mention the large utility companies, can hardly be overestimated, said Mr. Gorton in conclusion.

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ICHTHYOLOGY

Weed Seed "Horn" Brings Death to Baby Trout

HOW A LUCKLESS infant trout made an imitation horn out of the seed, or rather fruit, of a common weed, and did so good a job as to fool a competent scientist, is told by E. W. Gudger of the American Museum of Natural History, in a new publication of the Museum.

A little fish, only about an inch and a quarter long when it died, had been found and preserved by Frank J. Rieger, superintendent of the fish hatchery near Waynesville, N. C. From the front of its head, squarely between the eyes, there projected a four-sided little horn, sticking up rhinoceros-fashion. Around the base of this horn there was a fuzzy growth of fungus, which had caused the death of the fish.

When Dr. Gudger was first shown the fish, and even when he studied it later in the laboratory, he took this "horn" at full face value. Only later, when it was examined under a microscope, did its true nature become apparent. Then it was identified by Dr. J. K. Small of the New York Botanical Garden as the four-pronged fruit of the sticktight or bur marigold, a weed closely related to the common Spanish needle.

AN "ACQUIRED" CHARACTER

That never got a chance to be inherited, was this achene of the bur marigold that fastened itself on the nose of a young trout, eventually killing the poor little fish.

It seems likely that this particular fruit, with one of its prongs missing, somehow got into the pool in which a batch of new-hatched troutlings were swimming. By a weird accident it became saddled over the nose of one of them in such a way that one prong slipped right down the center line and the other two took hold on either side, hanging fast by the minute barbs with which these fruits are armed.

These barbs also made minute scratches in the skin, permitting the entry of the parasitic fungus that caused the death of the luckless little fish, at the same time holding the irritating fruit more firmly in place and concealing the mode of its attachment.

Dr. Gudger has not found a similar case of "horned fish" on record, though one German investigatior has discussed the fruits of this same weed as destroyers of young fish into whose ponds they fall.

Science News Letter, May 2, 1931

There are about 158,000 forest fires in the United States in a year.

RADIO-ASTRONOMY

Moonlight as Well as Sunlight Spoils Radio Reception

Dr. Stetson Finds Signal About a Hundred Per Cent. Better When the Moon Is Below the Horizon

MOONLIGHT, like sunlight, interferes with the successful reception of radio. Dr. Harlan T. Stetson of the Perkins Observatory at Ohio Wesleyan University made this announcement last week before a joint meeting of the American Institute of Electrical Engineers and of the New York Electrical Society.

The strengths of signals between Chicago and Boston for the last few years have been analyzed by Dr. Stetson and found to be received about one hundred per cent. better when the moon was below the horizon. This is believed to be due to a negative electrical charge on the moon.

The unfavorable influence of the moon on the reception of radio waves of 4000 kilocycles has also been independently established by Lieut. H. F. Breckel of the U. S. Navy Department in Cincinnati. Lieut. Breckel worked without knowing of the Perkins Observatory experiments.

Radio waves travel long distances only beecause they are reflected from a layer of electrified particles lying in the upper atmosphere about seventy miles from the earth. This radio mirror, called the Kennelly-Heaviside layer, after its discoverers, is pushed down towards the ground when the moon is passing overhead.

This produces somewhat the same sort of disturbance in radio transmission as that produced by sunlight. "The sun constantly bombards the earth's atmosphere with electrons or bundles of energy of high frequency," said Dr. Stetson. "These in turn tear apart the positive and negative charges of the atmospheric molecules. . . .

"If the sun is more active on occasion, as when large spots appear on its surface, the degree of ionization increases, producing substantially the effect of lowering the Kennelly-Heaviside layer and upsetting the radio reception. . . .

"Recent investigations in the field of correlation of radio reception with astronomical phenomena point now to the radio receiver as a valuable instrument of research in cosmic physics."

The decreased strength of reception at present over that experienced in the early days of broadcasting and the vastly poorer reception in daytime compared with night-time are both due to the changing effect of the sun's rays on the earth's atmosphere.

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METEOROLOGY

Carbonic Acid in Air Keeps Earth Warm

IF THE AMOUNT of carbonic acid in the air dicreased to a half of its present amount the temperature would fall enough to cause another great ice age on the earth. Calculations showing this were disclosed to the National Academy of Sciences meeting in Washington, this week, by Dr. E. O. Hulbert of the U. S. Naval Research Laboratory.

The small amount of carbon dioxide in the air absorbs much of the heat of the sunlight radiated from the earth's surface. A change in the amount of this gas changes markedly the amount of heat retained by the air and therefore the average temperature over the earth's surface. That changes in the carbon dioxide of the atmosphere might be adequate to cause the ice ages was suggested by the English physicist Tyndall in 1861. His suggestion fell into disrepute for many years, but the present work, and also that of Dr. H. B. Maris, of the Naval Research Laboratory, indicates that Tyndall's suggestion is still valid.

Dr. Hulburt's work was concerned in the first place with calculating the air temperature to be expected from a knowledge of the kinds and amounts of different gases present in the atmosphere at different heights and from a knowledge of how the various constituents of sunlight are absorbed by these substances. The sea level temperature calculated from Dr. Hulburt's formula comes within one degree of the known average earth temperature. This is taken to mean that emission and absorption of radiation are the main processes concerned in the control of the earth's atmospheric heat on the surface. At higher levels mixing by winds is included with the radiation processes.

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The greatest number of automobile deaths are in October, and the fewest in February, statistics for seven years show.

GEOPHYSICS

Yellowstone Geyser Water Would Make Only Small River

GEYSERS and hot springs make their impressive display in Yellowstone National Park on a surprisingly economical expenditure of water. The total run-off amounts to only 107 cubic feet per second, or enough to form a creek 50 feet wide and one foot in average depth, flowing at a rate of one and one-half miles per hour. This is only about three per cent. of the water in the rivers that flow out of the park.

This is one of the conclusions reached by Dr. E. T. Allen, who has been conducting the first comprehensive study of the geysers and hot springs in the first and greatest of the world's national parks. This survey is being carried on by the Carnegie Institution of Washington, with the cooperation of the U. S. National Park Service. Dr. Allen's report was presented in Washington this week at the meeting of the National Academy of Sciences.

Dr. Allen has also made an estimate of the amount of heat dissipated by the geysers and hot springs. Leaving out of account the vents that discharge only steam, he found that the geysers and hot springs give off every second about 200,000 kilogram calories, or enough to melt 2.9 tons of ice.

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ASTRONOMY

May Skies Herald Approaching Summer

BY JAMES STOKLEY

NOT ONLY in its proverbial mild weather does the month of May bring a foretaste of approaching summer. The evening skies also herald its coming. Orion, Taurus with red Aldebaran, and the dog-star Sirius, so familiar in the winter sky, have now disappeared below the western horizon. In the east, Vega, part of Cygnus, and Scorpius, with the other famous red star, Antares, have arisen to take the place of the glories that have departed temporarily, and as the months go on, and summer begins, they will be conspicuous objects in the evening sky.

Altogether, in the evening sky in May, you can see nine first magnitude stars, which are now supplemented by two bright planets. High in the north is the familiar great dipper, in Ursa Major, the great bear. Though this group contains none of the brightest stars, its characteristic shape makes it a good starting point from which to find the main attractions of the month. Everyone knows how the two stars at the end of the bowl of the dipper are called "the pointers." If you imagine a line drawn from them to the north, you can locate the north star, Polaris, which is in the constellation of Ursa Minor, the lesser bear, and also marks the end of the handle of the little dipper.

But continue the line through the pointers in the opposite direction. About a quarter again as far from them as Polaris is the constellation of Leo, the lion. At the western end of the group is the sickle, almost as familiar as the dipper. As it hangs in the sky, its blade pointing westward and the handle to the south, one can easily see the resemblance to that useful agricultural implement. The first magnitude star, Regulus, is at the end of the handle. This is the "royal star," so called because it was supposed to rule the affairs of heaven, according to the ancient astrologers, whose superstitions are now thoroughly discredited. A little below and to the right of Regulus is the planet Mars, a little brighter, and conspicuous by reason of its steady red light. Below Mars, and farther to the right, is the other May planet, Jupiter, still brighter, and exceeding in brilliance any of the stars now visible. A short distance above Jupiter, and also to the right, is Pollux, the brighter of the twins, Gemini. Castor, his fainter, second magnitude, brother, is close beside. Low in the west shines Procyon, in Canis Minor, the lesser dog, and low in the northwest Capella marks Auriga, the charioteer.

Jupiter and Mars, like all the other bright planets, the moon and the sun, always remain close to an imaginary line in the sky called the ecliptic. This line marks the place where the plane of the earth's orbit would cut the sky. Regulus, though it is a star, and does not move around like the planets, happens to be almost on the ecliptic, so from these three points one can trace its course. Immediately to the east of Leo, among the constellations of the ecliptic, is Virgo, the virgin, in which the most brilliant star is Spica. This star is also close to the ecliptic. Its name signifies the ear of wheat that the old star maps represented the virgin as carrying.

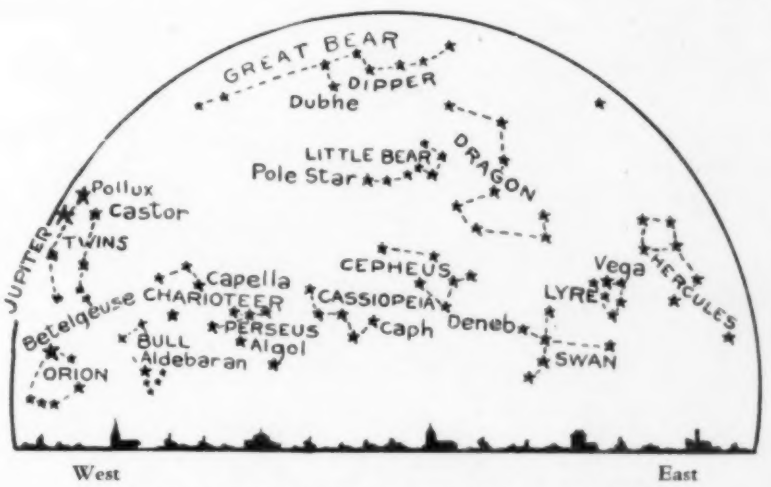
"Rival of Mars"

The next constellation in the ecliptic is Libra, the scales, but it contains no very bright stars, so we continue to Scorpius, the scorpion, now just appearing in the evening above the southeastern horizon. Its most brilliant star, the red Antares, whose name means "the rival of Mars," is seen low in the sky. Just now, when Mars and Antares are both in the sky, it is easy to compare them, and to see how the similarity of color suggested the name.

Adjoining Virgo to the north is the group of Bootes, the herdsman. His most brilliant star, Arcturus, is almost overhead. This constellation is just at the end of the handle of the great dipper. The handle marks the enormous tail of the bear, Ursa Major, a group with which Bootes has been closely associated. In fact, the name Arcturus is derived from two Greek words which mean "the bear's tail," and as the name was at one time applied to the entire constellation of Bootes, the connection is obvious.

Low in the northeastern sky can now be seen the bright star Vega, in Lyra, the lyre. Just below it is the constellation of Cygnus, the swan. During May evenings it is only partly above the horizon, but later in the night it rises higher. Then can be seen its familiar shape, in the form of a cross, which has earned for it the other name of "northern cross." Deneb, the last of the first magnitude stars in the May evening sky, is at the northern end of the group.

Quite different from the conspicuous constellations mentioned is one now at the zenith in the evening, about halfway between the bowl of the great dipper and Arcturus. Except under very good conditions, only two stars can be seen, the brighter one being Cor Caroli, the heart of Charles. This name was given by (*Turn to page* 286)



HIGH IN THE NORTH IS THE GREAT DIPPER

Its characteristic shape makes it a good starting point from which to find the main attractions of the month.

MEDICINE

Epilepsy Diet Found To Provoke Pellagra

NEW LIGHT has been shed on the epilepsy problem which may lead to discovery of a cure for this baffling disease, or at least to a knowledge of its cause, as a result of a discovery by Dr. N. P. Walker, director of the Milledgeville State Hospital, Georgia, and Dr. G. A. Wheeler of the U. S. Public Health Service, Washington.

Dr. Walker observed that sufferers from epilepsy, when fed a high-fat diet, were benefitted as far as the epilepsy was concerned, but developed pellagra, hard-times disease which is believed due to a lack of vitamin G in the diet.

In collaboration with Dr. Wheeler, Dr. Walker studied ten women patients suffering from epilepsy. He found that when they were fed a diet nearly completely lacking in vitamin G but otherwise complete in all respects, the number of epileptic seizures was greatly reduced and the nervous symptoms due to the epilepsy also improved. However, the patients developed pellagra while on this diet. When the pellagra was relieved by feeding yeast, a rich source of the anti-pellagra vitamin, the epilepsy became worse.

No conclusions can be drawn from these observations, and it is not suggested by Drs. Walker and Wheeler that pellagra be used to treat epilepsy, as malaria is used for treating paresis. However, their study points the way for further research on epilepsy which may yield final solution of the problem.

Science News Letter, May 2, 1931

PHYSIOLOGY

Children Do Not Follow Typical Growth Curves

CHILDREN do their growing as little individuals, and the "average" curves, that are supposed to tell how the young idea shoots toward the ceiling and out of his clothes, really do not mean very much.

So indicated Dr. Charles B. Davenport of the Eugenics Record Office of the Carnegie Institution of Washington, speaking at the meeting of the American Philosophical Society in Philadelphia last week.

Studies on child growth have hitherto been made by selecting a large group of children, measuring them, and averaging up the mass. This makes a beautiful theoretical curve, which is supposed to indicate rate of growth for the young.

However, when Dr. Davenport constructed individual curves for individual children, he found that it was only by chance that their period of growth coincided with the average as indicated by the mass curves. Moreover, instead of being spread out over ten years or so of rather gradual increase in height, these individual measurements showed sudden spurts, with greatest growth taking place in only two years or so. These spurts are individual matters, too, for in some children they come early, in others late.

Science News Letter, May 2, 1931

ETHNOLOGY

Isolated Community Keeps Old Speech and Customs

AN "ISLAND" of Germans entirely surrounded by Slavs for the past 600 years, keeping the ancient customs and the strange dialect they carried with them when they made their trek into what is now Yugoslavia, little known even to their neighbors and almost wholly unknown to the world at large, was described by John Dyneley Prince, American Minister to Yugoslavia, before the American Philosophical Society, at its annual meeting in Philadelphia last week.

These people, numbering some 15,000, are known as the Gottschee Germans. Their ancestors settled in Slovenia six centuries ago, and the group has stuck to the same spot ever since, with the exception of several thousand who in 1880 emigrated to the United States and Canada because of overcrowding at home.

The people of Gottschee live at peace with their Slavic neighbors, Mr. Prince said, and are left unmolested by the Yugoslavian government. A system of joint government has been worked out which gives the community a large degree of autonomy.

The most interesting thing about the Gottschee people is the archaic type of German they speak. The language is quite unintelligible to other Germans because of the unusual letter-substitutions in most of the words. For example, High German for "What is that?," "Was ist das?," becomes in Gottschee, "Baas ischt dos?"; and "Ich habe gesagt," "I have said," in Gottschee is "I hon geschoait."

Science News Letter, May 2, 1931

IN SCIENCE

ENGINEERING

144 Autos Parked In Space For 12

ONE HUNDRED and forty-four automobiles are parked in the space ordinarily required for 12 in a new automatic parking building which has been in successful operation for several months at the Westinghouse Co. in East Pittsburgh. The present structure is the outgrowth of an experimental machine that parked a smaller number of cars.

Each automobile is run into an individual cage, one of a series that is carried on two endless chains over sprocket wheels at the bottom and top of the parking building in the manner of a conveyor. When a cage is called to the driveway level by means of a key, the machine automatically selects the shortest route and an electric motor moves the cage at 100 feet a minute.

Science News Letter, May 2, 1931

GEOLOGY

Reefs Formed of Sponges Found on Midwest Prairies

WHEN tropical seas rolled over what are now the midwestern prairies, four or five hundred million years ago, the reefs that built themselves around the shores of what lands there were then were not all coral, as has commonly been supposed. The researches of Prof. and Mrs. Carroll Lane Fenton, of the University of Buffalo, have shown many of the limestone masses in the region south of the Great Lakes to consist of calcified bodies of sponges.

Curiously enough, the sponge varieties responsible for most of the reef formation were not themselves built on limestone skeletons. They were formed over a silica framework, and the lime deposition probably took place after they had died.

The most characteristic form for such a reef is a rounded dome. Modern reefs of the same shape but much higher as a rule, are found off the coast of Brazil.

Science News Letter, May 2, 1931

NCE FIELDS

NUTRITION

Codfish Rivalled As Vitamin King

THE POSITION of the cod as the vitamin A king of fishes has been attacked. According to Prof. E. Poulsson of the State Vitamin Institute in Norway, not only do the 70 to 80 members of the cod family contain just as much of that valuable vitamin as the cod itself, but many other fish actually excel the cod in this respect.

The shark family in particular produces liver oil containing weight for weight several times more vitamin A than the cod family. The liver oil of the most common European shark has eight times as much vitamin A content as does cod liver oil, and that of the dogfish twice as much. However, the codfish can still boast superiority to the shark in the vitamin D content of his liver oil, for it is about ten times that of the shark's.

Moreover, thanks to the cod's obliging habits of timing his arrival in certain places at certain seasons with meticulous precision, he is likely to retain his position as vitamin A king. Other fish may produce more vitamins but they cannot be counted on for the regular and sufficient supply yielded by the codfish.

Science News Letter, May 2, 1931

ARCHAEOLOGY

Holder of Priestly Office Carved About 2400 B. C.

See Front Cover

GOOD sculptors, those Sumerians who lived in the land around about Ur of the Chaldees 4,000 years ago!

This week's cover picture shows the upper portion of a broken life-sized statue found at the city of Lagash, north of Ur. The features, finely cut, portray a man of dignity and reserve. The proportions of the body are skilfully handled. The arm muscles almost ripple beneath the stone, and the drapery over the left arm is softly folded.

The statue, which is now being exhibited in London by Sydney Burney, is pronounced to date from the time of Gudea, a city governor of Lagash, who lived between 2400 and 2300 B. C. That the statue may represent Gudea himself is the possibility suggested by an expert of the British Museum. The features closely resemble those in some of the statues marked with Gudea's name.

The shaven head indicates that the man held priestly offices and the attitude of the folded hands shows that the portrait represents him as he appeared before the city's god.

Science News Letter, May 2, 1931

SEISMOLOGY

One Kind of Earthquake Wave Keeps to Same Speed

EARTHQUAKE waves of compressional type all travel at about the same speed, concludes Dr. H. Henrietta Sommer of the University of California, Berkeley, after a detailed study of fifty records of the Alaskan earthquake of October 24, 1927.

For many years there has been a difference in opinion among seismologists as to whether a compressional wave of long period travels faster than a wave of shorter period. Miss Sommer investigated only the first group of preliminary waves, which is longitudinal in nature, and analogous to sound waves. They are the swiftest of the earth waves, attaining a speed of over six miles a second at great depths.

Due to its high intensity the Alaskan earthquake was admirably suited for a study of the travel time of the longitudinal waves. The 1927 quake severed military cables in two widely separated regions, between Wrangell and Ketchikan in the south, and between Juneau, Haines and Skagway in the north.

The closest station recording the earthquake was at Kodiak. On the seismogram traced by the tremor as it passed Kodiak, Miss Sommer found that longitudinal waves of very different periods, one of two seconds and one of 25 seconds, arrived at the same instant. A similar phenomenon was noted on seismograms of stations at a greater distance from the epicenter.

Travel time curves compiled by Dr. Perry Byerly, seismologist of the University of California, were used in identifying the various types of waves. Earth waves travel in curves and not in straight lines, due to irregularities in the earth's composition.

Science News Letter, May 2, 1931

CHEMISTRY—GEOLOGY

Potash Center May Shift To Italy

FOR generations the Stassfurt, Germany, beds of potash salts were the only large scale sources of supply for the world.

The trouble is not that potash does not occur elsewhere, but that it is found in combinations and concentrations that make its extraction a costly matter in competition with the German article.

For instance, the volcanic rocks of central Italy contain hundreds of thousands of tons of leucite, a mineral containing a silicate of aluminum and potash, but the extraction by the usual processes is not an economic proposition.

However, Baron Gian Alberto Blanc, professor of geochemistry in the University of Rome, has just informed the British Institution of Chemical Engineers that his twelve years' study of this problem has borne fruit, and a large plant to treat 100 metric tons of leucite a day is nearly completed at Aurelia, near Rome.

Science News Letter, May 2, 1931

BOTANY

Hardy Wild Flowers Defied Ancient Ice

THE POSSIBILITY that plants of the temperate zone may have defied the oncoming ice of the Glacial Age a hundred thousand years ago, and clung to their hillsides within a few miles of the mountains of frozen water, is suggested by Prof. Edgar T. Wherry of the University of Pennsylvania. This view, which runs counter to the commonly accepted opinion that the glaciers were always fringed with a wide area where nothing but Arctic plants grew, comes as the result of his study of geographic varieties of the common moss phlox.

He found that the geographic distribution of these phlox varieties makes it appear probable that the slow migration of the plants took place not from south to north but from east to west, parallel with the ice front and within a few miles of it. This suggests rather strongly that living conditions for temperate zone plants were not altogether impossible even at the very boundary of the invading glacial fields.

Science News Letter, May 2, 1931

ASTRONOMY-PHOTOGRAPHY

Movies of Sunset on Moon Are Shown Before Scientists

Amateur Astronomers Exhibit Results of Three Years' Work Making Fast Motion Pictures of the Moon and Jupiter

A NEWS REEL film of events on the moon and the distant planet Jupiter was shown to the members of the American Philosophical Society at the late session of their annual meeting in Philadelphia last week.

The astronomer-impressario was Dr. Heber D. Curtis of the Detroit Observatory of the University of Michigan at Ann Arbor. The pictures were made in the McMath-Hulbert Observatory near Pontiac, Mich., where three unusually gifted amateur astronomers, Robert McMath, Francis McMath and Henry S. Hulbert, have put in three years of hard work experimenting on the application of the movies principle to celestial photography.

The first film showed a sunset on one of the craters of the moon. As the sun sank toward its rim the shadow of a small peak in the center of the crater could be seen growing longer, creeping across the floor and then up the opposite wall. At the same time the shadows of the crater wall nearest the sun grew larger and finally obliterated the center of the great depression.

The second film was of the planet Jupiter showing the peculiar zones or belts that circle its great sphere and making its rotation plainly evident. After that a view was shown of Jupiter's many moons speeded up to show many hours of their revolutions about the parent planet in a few minutes.

Exacting Work

The work of taking these films is most exacting, Prof. Curtis said; frequently the telescope must be guided with the greatest accuracy for periods of six to eight hours. In the case of the moon special gears had to be calculated and cut because of the rapid motion of that satellite. For one element of the moon's motion a special motor had to be constructed.

In recognition of their work as pioneers in celestial movies the three men who built the observatory and made the films have been made honorary curators of the Observatory of the University of Michigan.

None of the three associates of Dr. Curtis is a professional astronomer. Henry S. Hulbert, when not making celestial movies, is senior judge of the probate court of Detroit. Robert McMath is an engineer and manufacturer, while Francis McMath is a consulting engineer.

Science News Letter, May 2, 1931

ENGINEERING

New Sand Trap Cleans Irrigation Water

MUCH of the world's precious irrigation water, now wasted in washing the silt out of ditches, will undoubtedly be saved by the combination vortex and riffle sand trap just developed in the laboratory of the Colorado Agricultural Experiment Station at Fort Collins, Colo., by Ralph Parshall, senior irrigation engineer and his associates, Carl Rohwer and William J. Colson.

This new method which traps or segregates heavy materials through a system of triangular riffles and a special vortex tube placed at an angle across the bed of a channel, is expected not only to solve the sand and silt problems of many irrigation districts but to be useful in industrial operations as well.

Among the many ingenious devices tried out are rectangular, triangular, and semicircular riffles fastened at intervals on the slightly inclined floor of a test flume. The triangular up-stream riffles were found to be very efficient in moving the bed load of sand, gravel and even large cobble stones, laterally across the channel and out through the proper sluice gates.

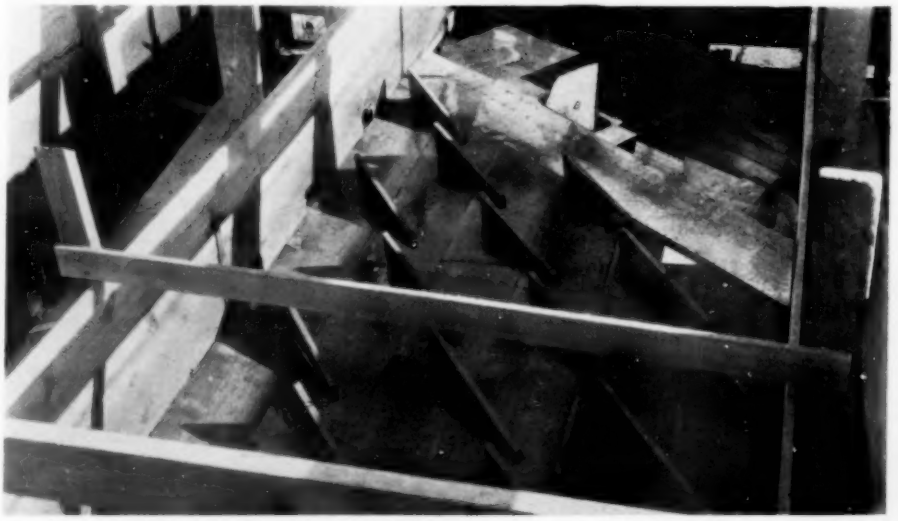
All gravel that escaped these riffles was caught by the whirling action in a special tube and speedily carried out of the main stream through another sluice gate.

According to the results of these experiments, this new sand trap is considered automatic, fool-proof and continuous in its operation. Plans are now being completed for the construction of a large combination vortex and riffle sand trap at the head of the Colorado Canal near Boone, in the Arkansas Valley.

Sand accumulation in this canal often has reduced the amount of water carried from 600 to 400 cubic feet per second in a week's time. In sluicing out this sand under present conditions the total flow in the canal is required for about three or four days.

Science News Letter, May 2, 1931

About 40 varieties of strawberry are grown commercially in the United States.



CLEANSING FLUME FOR IRRIGATION WATER

A development of the Colorado Agricultural Experiment Station at Fort Collins. It will save much irrigation water now wasted in washing sand and silt out of the ditches.

ELECTRICITY

Dust, Soot, Smoke and Fumes

Cleared From Factory Air by Electrical Precipitation

"A Classic Invention"

PROBLEMS IN SMOKE, FUME, AND DUST ABATEMENT. By F. G. Cottrell. In Annual Report of the Smithsonian Institution, 1913. Washington: Government Printing Office, 1914.

THE precipitation of suspended matter, whether in gases or liquids, may be accelerated by electricity in the form of either direct or alternating current, but the mode of action and the type of problem to which each is best applicable differ in certain important respects.

Where an alternating electromotive force is applied to a suspension the action consists for the most part in an agglomeration of the suspended particles into larger aggregates out in the body of the suspending medium and a consequently more rapid settling of these aggregates under the influence of gravity.

Thus, it has been stated that if powerful Hertzian waves are sent out under proper conditions into foggy air the alternating fields set up in space cause an agglomeration of the particles of liquid into larger drops, which then settle much more rapidly. Considerable work aimed at the application of these phenomena to the dispelling of fog on land and sea was said to have been done some years ago in France and England, but very little as to definite results appears to have been published. Another application of alternating current along these lines is found in a process now in use in the California oil fields for separating emulsified water from crude oil.

Queen Elizabeth

would not let her subjects burn coal in the city of London while Parliament was holding session.

Dr. Cottrell

solved the queen's problem in more permanent fashion and gave his invention to the public.

Alternating current may thus be used to advantage where the masses of fluid to be treated are fairly quiescent, and a simple agglomeration of the suspended particles into larger aggregates is sufficient to effect separation by gravity or otherwise.

In the case of the large volumes of rapidly moving gases in smelter flues the agglomerating and settling process is, however, too slow even when the flues are expanded into as large dust chambers as are commercially feasible. It is in such cases that unidirectional current methods have been particularly important.

Theory of Electrical Precipitation

If we bring a needle point connected to one side of a high potential direct-current line opposite to a flat plate connected to the other side of the line we find that the air space between becomes highly charged with electricity of the same sign as the needle point, irrespective of whether this is positive or negative, and any insulated body brought into this space instantly receives a charge of the same sign. If this body is free to move, as in the case of a floating particle, it will be attracted to the plate of opposite charge and will move the faster the higher its charge and the greater the potential gradient between the point and plate.

Even if there are no visible suspended particles the gas molecules themselves undergo this same process, as is evidenced by a strong wind from the point to the plate, even in perfectly transparent gases. The old familiar experiment of blowing out a candle flame by presenting it to such a charged point is simply another illustration of the same phenomena.

As above indicated, the first step toward practicability was of necessity a commercially feasible source of high-tension direct current. The obstacles to building ordinary direct-current generators for high voltages lie chiefly in difficulties of insulation, and if this is avoided as to individual machines by working a large number in series the multiplication of adjustments and moving parts intrudes itself. On the other hand, high potential alternating current technique has in late years been worked out most thoroughly, and commercial apparatus up to 100,000 volts and over has been available for some years in the market.

DR. FREDERICK G. COTTRELL

The procedure actually used in the installations described below is diagrammatically illustrated in the early Patent Office drawing (fig. 2), and consists in transforming the alternating current from an ordinary lighting or power circuit *P* up to some 20,000 to 75,000 volts through the transformer *O*, and then commutating this high potential current into an intermittent-direct current by means of a special rotating contact maker *J* driven by a synchronous motor *L*. This unidirectional current is applied to a system of electrodes in the flues carrying the gases to be treated. In the particular form shown in the drawing the wall of the chamber *A* itself acts as one electrode, the other electrode *C* being suspended within it. The heating circuit *h* and inlet for clean gas *G* are merely for protection of the insulation from condensation of acid and moisture.

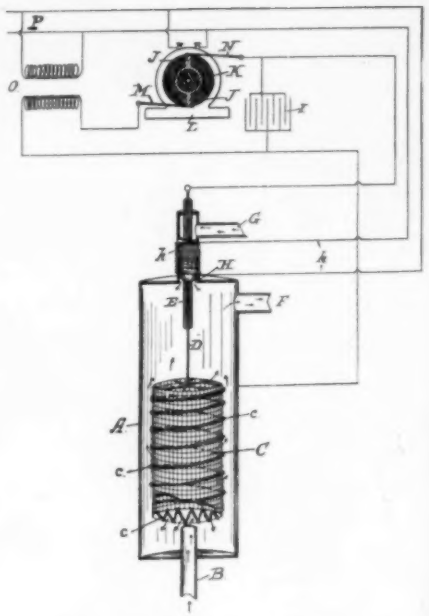
The electrodes are of two types corresponding to the plate and point in the experiment above cited. The construc-

tion of electrodes corresponding to the plate presents no special problem, as any smooth conducting surface will answer the purpose. With the pointed or discharge electrodes it is quite otherwise, and the working out of practical forms for these proved the key to the first commercially successful installations.

In laboratory experiments when the discharge from a single point or a few such was being studied fine sewing needles or even wire bristles answered very well, but when it was attempted to greatly multiply such discharge points in order to uniformly treat a large mass of rapidly moving gas at moderate temperatures great difficulty was encountered in obtaining a powerful and, at the same time, effective distribution of current.

It may be of interest to note that the clue to the solution of this difficulty came from an almost accidental observation. Working one evening in the twilight, when the efficiency of the different points could be roughly judged by the pale luminous discharge from them, it was noticed that under the particular conditions employed at the time this glow only became appreciable when the points had approached the plates almost to within the distance for disruptive discharge, while at the same time a piece of cotton-covered magnet wire, which carried the current from the transformer and commutator to the discharge electrodes, although widely separated from any conductor of opposite polarity, showed a beautiful uniform purple glow along its whole length. The explanation lay in the fact that every loose fiber of the cotton insulation, although a relatively poor conductor compared to a metallic wire, was still sufficiently conductive from its natural hygroscopic moisture to act as a discharge point for this high potential current, and its fineness and sharpness, of course, far exceeded that of the sharpest needle or thinnest metallic wire. Acting on this suggestion, it was found that a piece of this cotton-covered wire when used as a discharge electrode at ordinary temperature proved far more effective in precipitating the sulphuric-acid mist, which was then the object of study, than any system of metallic points which it had been possible to construct. Perhaps the greatest advantage thus gained lay in the less accurate spacing demanded between the electrodes of opposite polarity in order to secure a reasonably uniform discharge. Much of the importance of this discovery at the time lay in the limited potentials of a few thousand volts then available to the experimenters in their laboratory work.

In practice, of course, a more durable material than cotton was demanded for the hot acid gases to be treated, and this was found in asbestos or mica, the the fine filaments of the one and the scales of the other supplying the discharge points or edges of the excessive fineness required. These materials were twisted up with wires or otherwise fastened to suitable metallic supports to form the discharge electrodes in such wise that the current had to pass only a short distance by surface leakage over them, the slight deposit of moisture or acid fume naturally settling on them serving to effect the conduction. With the further development of the electrical technique to provide the far higher voltages now being used in commercial operation, the choice and design



PATENT OFFICE DRAWINGS

Of the first commercially successful system of electrical precipitation (Cottrell, 1908).

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of electrodes has become much more flexible, including simple metallic wires, sharp metallic strips, and the like. In fact, the very phenomena of so-called corona loss or direct leakage from the wire into the air on high-tension transmission lines, which are today the chief stumbling block of the power companies in going very far above 100,000 volts on these lines, become exactly what is desired in the processes of precipitation, and with the voltages now used a bare metal wire of moderate size or the relatively thin edge of a metallic sheet may be made to furnish an excellent discharge. . . .

Electrical Precipitation and Gaseous Constituents

The electrical process, it must be remembered, precipitates only suspended particles, be they liquid or solid, but does not in itself extract any of the truly gaseous constituents of the mixture under treatment. What is gas under one set of conditions may, however, be solid or liquid under others. Thus recent experiments upon arsenic-refining furnaces at Anaconda have indicated the practicability of installing two precipitating units in series, the first treating the hot gases as they come directly from the furnaces roasting crude flue dust, their temperature at this point being so high that the arsenic is for the most part in the form of true gas, and only the non-volatile dust mechanically carried over by the draft is precipitated. Beyond this unit the gases are cooled by admixture of cold air, and the arsenic separates as a cloud of solid fume, which is then precipitated in a state of high purity in the second electrical precipitation.

This principle might, of course, also be applied in a greater number of stages to mixtures of materials of different volatilities and in this way opens up new possibilities for the application of fractional distillation and condensation.

Another indirect method of removing a particular gaseous constituent from a mixture by the electrical processes is illustrated by an installation now in operation at the Hooker Electrochemical Co., Niagara Falls, where the exit gases of the chloride of lime factory are freed from their last traces of chlorine by first blowing into them as they travel along finely divided slaked lime and a little farther down the flue recovering this again by the precipitation unit shown in figures 40 and 41. Although the lime thus remains in the gases only a few seconds, it is in such a fine state of subdivision that absorption is complete and the gases leave the treater without a trace of odor.

Still another application, which in a sense is almost the reverse of this procedure, has been worked out in connection with the drying of solutions and emulsions, such as milk and other unstable material, by atomizing them in a fine spray into warm dry air and collecting by electrical precipitation the fine dry powder left by the evaporation of the microscopic droplets as they float along.

Science News Letter, May 2, 1931

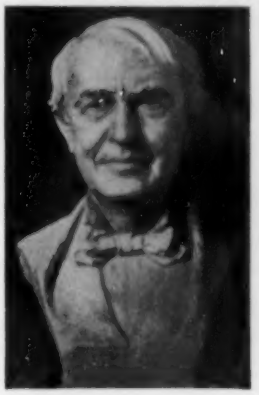
Of the 78 medical schools under the United States flag, the largest enrollment is at the University of St. Thomas, Faculty of Medicine and Surgery, in the Philippines.

The Rare Earth Elements

"Despair of Systematic Chemists"

are the subject of

NEXT WEEK'S CLASSIC OF SCIENCE



Announcement!

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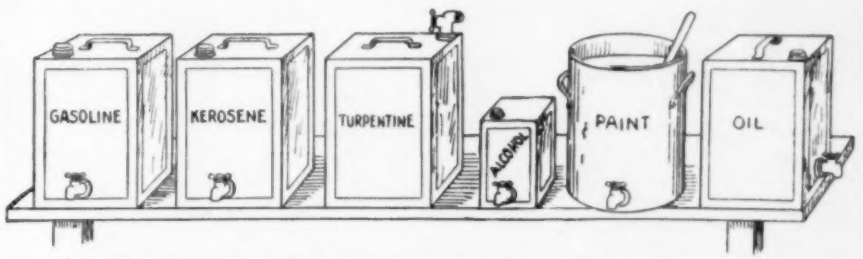

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(Patent Applied For)

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ASTRONOMY

May Skies Herald Summer

From Page 279

Edmund Halley, whose own name is perpetuated in the best known of all comets. He applied this designation in 1725, in honor of Charles II. At the time Halley was Astronomer Royal of England, a position which evidently gave him sufficient authority to name a star.

When Halley thus named this star, the constellation it marked was less than half a century old. Most of the constellation names date from remote antiquity, but this little group, called Canes Venatici, the hunting dogs, was not so designated until the year 1687. The sponsor of the name was Johannes Hevelius, who had a great observatory at Dantzig. Before his time the star maps, that represented the imaginary constellation figures, had several large gaps, especially around Ursa Major. Evidently Hevelius was a rather systematic person, so these gaps, containing faint stars belonging to no constellation, were a source of irritation to him. He proceeded to fill them in. In the year 1687 he published a set of beautifully engraved star maps, covering the entire sky. The title-page of this work, which is now extremely rare, is an allegorical picture representing Hevelius presenting his constellations to Urania, the muse of astronomy.

What is perhaps the most interesting feature of this little constellation cannot be seen with the naked eye. Almost on a line joining Cor Caroli with the star at the end of the handle of the dipper, named Benetnasch, and about three-quarters of the way is a famous spiral nebula. Through a moderate sized telescope, under good conditions, it appears only as a faint patch of light. But through the very greatest instruments, or on long exposure photographs with big telescopes, its structure is seen. This was first observed nearly a century ago by the Earl of Rosse, an Irish nobleman who had a very famous observatory at Parsonstown, near Dublin. His great telescope was a reflector with a mirror six feet in diameter. Not until 1919, when the 100-inch reflector was completed at Mt. Wilson, in California, was this old-timer exceeded in size. Long since, however, it had become obsolete, and much smaller modern instruments surpass it in performance.

The Whirlpool Nebula

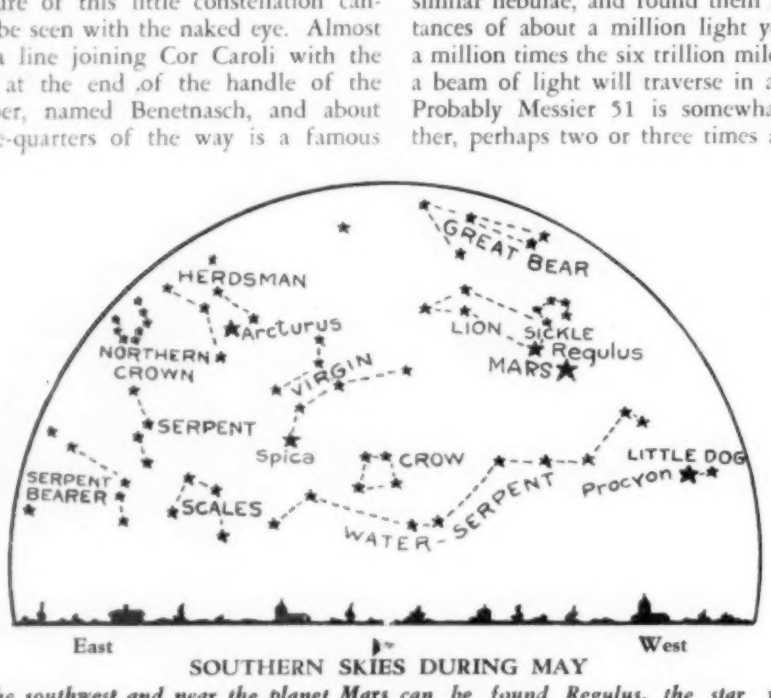
The Earl of Rosse, observing its spiral structure for the first time, appropriately named it "The Whirlpool Nebula." It looks like a great pinwheel. To the astronomer it is usually Messier 51, its number in Messier's catalog of such objects.

When the nobleman first observed this beautiful object, probably he had no idea that he was gazing at an external galaxy—a system of stars very much like that of which the sun, and all the stars we see, are part. Yet that is just what it is. A few years ago Dr. Edwin P. Hubble, a Mt. Wilson astronomer, measured the distance of two similar nebulae, and found them at distances of about a million light years—a million times the six trillion miles that a beam of light will traverse in a year. Probably Messier 51 is somewhat farther, perhaps two or three times as far.

This part of the sky, including the constellation of Coma Berenices, or Berenice's hair, between Canes Venatici and Virgo, is about the richest region of the sky in spiral nebulae, because it marks the pole of the Milky Way. That is, of all the parts of the sky that can be seen from the United States at any time, this part is farthest from the Milky Way. Most astronomical objects, like the ordinary stars, are most numerous in the Milky Way, but the spiral nebulae avoid it. The reason is that the Milky Way forms a flat,disc-shaped system, the Galaxy, of which our sun is a member, located somewhere near the center. The spiral nebulae are external galaxies. When we look at the Milky Way, we are looking through the greatest thickness of stars in our own system, and these, together with the dark material that seems to be associated with them, prevent us from seeing out beyond. But when we look towards the poles, there is not so much material in the way, and we get a nearly unobstructed view of what is outside.

Just as the stars are clustered together to form the galaxies, so are the galaxies themselves gathered into super-galaxies, a fact that has been clearly demonstrated by the distinguished director of the Harvard College Observatory, Dr. Harlow Shapley. The super-galaxy to which he has given the greatest attention is in this same region of the sky, partly in Coma and partly in Virgo, so it is referred to as the Coma-Virgo cluster. According to Dr. Shapley, it is several million light years in extent, and contains perhaps 500 galaxies. The diameters of the individual members range from one to two thousand to more than twenty thousand light years.

The exact significance of this system, and its relation to our own Galaxy, is still a matter of discussion. According to older figures, our Galaxy is far larger than any of the known spiral nebulae, so Dr. Shapley made the suggestion that we are living in a super-galaxy, perhaps more condensed than the Coma-Virgo cluster, but of the same general nature. During the past year, however, the work of Dr. R. J. Trumpler, of the Lick Observatory, has shown definitely that there is a large amount of light-absorbing stuff in the Milky Way, and that one effect would be to make apparent distances in the Milky Way seem too large. If this is the case, our Galaxy may not be much larger than the outside ones after all.



SOUTHERN SKIES DURING MAY

To the southwest and near the planet Mars can be found Regulus, the star which, though it does not move around like the planets, happens to be almost on the ecliptic, the imaginary path of the planets.

BOTANY

Nature Ramblings

By FRANK THONE

Oak Blossoms

FEATHERY little catkins are hanging from the twigs of the oak trees. They grow out of scaly little buds, on the last couple of inches of last summer's growth, just behind the new green shoots of this spring's production, with their shiny, tiny new leaves. These are the staminate, or male flowers, that produce the pollen and scatter it to the wind, which carries a few chance grains out of each million to the pistillate, or female flowers, that form the seed.

These pistillate flowers are much less conspicuous objects; mere round reddish or purplish little nubbins, each set in a scaly little nest that later becomes the acorn cup, and each with three little curved fingers or horns projecting to catch the drifting pollen.

Acorn-making is as slow and deliberate as everything else connected with the growth of the oaks. After the pollen has lodged on the pistillate flower the process of fertilization is not completed, in some of the oaks, for months, and the growth and ripening of the acorn is not finished until the autumn of the following year.

Unlike some of the catkin-bearing trees, the oak, and its relatives the beech and the chestnut, bear both male and female elements on the same tree, though not in the same flowers, as in pansies and lilies and similar familiar blossoms.

Bees often visit blossoming oak trees, though they are not concerned with the transfer of the pollen. Bee-keepers blame the dark, strongly-flavored honey that they get at this time of year on the oak trees. They do not like it, because it cannot be sold at full price; though the real honey "fan" knows how to relish "oak honey" as a change from the more delicately flavored sorts.

Science News Letter, May 2, 1931

PHYSICS

Cosmic Rays Questioned As Atom Building Signals

NOT ENOUGH atom-forming collisions occur in the depths of space to account for the intensity of penetrating cosmic radiation observed here on the earth, Dr. L. S. Kassel, of the U. S. Bureau of Mines at Pittsburgh, has reported to the American Chemical Society.

The theory of Dr. R. A. Millikan and Dr. G. H. Cameron of the California Institute of Technology that atom-building is the cause of the ultra-X-radiation that streams down into the earth's atmosphere from above, would require that in the formation of an iron atom, for instance, 28 electrons and 56 protons or hydrogen-atom cores would need to gather in some way.

This preliminary clustering process, it is known, must begin by collisions of particles in sets of three. Dr. Kassel asserted that these triple collisions occur ten million billion times too seldom to account for the observed intensity of cosmic rays.

Iron is only one of several kinds of atoms whose formation from electrons and protons may give rise to the penetrating rays.

Science News Letter, May 2, 1931

ARCHAEOLOGY

Find Prehistoric Ruins On Menagerie Site

A PREHISTORIC Pueblo dwelling, discovered by a menagerie owner who purchased the site for his show, has been examined by the Museum of Northern Arizona, and the old Indian ruins are pronounced to date from the twelfth century A. D.

"The pueblo is the property of Harry 'Indian' Miller, of Lupton," it was stated by Lyndon L. Hargrave, of the museum staff. "Miller purchased the location, but on removing the wind-blown accumulation, discovered masonry walls at a depth of several feet below the present ground level.

"Fifteen rooms have been uncovered, and test holes within the shelter indicate that at least 30 rooms are still to be opened. The overhang of the cliff easily provided shelter for 50 rooms. The rooms exposed are excellently preserved and many details of construction are discernible. One room is suggestive of a tower.

Science News Letter, May 2, 1931

Macmillan

SCIENCE LEADERS for Secondary Schools

Peabody & Hunt:
BIOLOGY AND HUMAN WELFARE
Emphasis on the functions rather than the structure of living organisms.

Trafton:
BIOLOGY OF HOME AND COMMUNITY
A combined treatment of plant and animal life in their close relations to human welfare.

Black & Conant:
PRACTICAL CHEMISTRY (Revised)
Laws and principles of chemistry in their practical applications to daily life.

Holmes & Mattern:
ELEMENTS OF CHEMISTRY
Maintains a perfect balance between theory and applied chemistry.

Trafton:
SCIENCE OF HOME AND COMMUNITY (Revised)
A textbook in general science that is "excellent both from the point of view of scientific training and that of social cooperation and vocational intelligence."

Black & Davis:
NEW PRACTICAL PHYSICS
School people call it "the one superlative textbook of its kind published today."

Lynde:
EVERYDAY PHYSICS
General principles related to home appliances with which the student is already familiar.

Hurd:
WORK-TEST BOOK IN PHYSICS
Use it with any standard physics textbook. Nineteen work-units and 19 tests to supplement the regular work.

Hegner:
PRACTICAL ZOOLOGY
Facts and theories about animals which have the most direct bearing upon the life of the student and the community.

MACMILLAN

New York Boston Atlanta
Chicago Dallas San Francisco

• First Glances at New Books

Scientific Biography

CONTEMPORARY IMMORTALS—Archibald Henderson—*Appleton,* 209 p., $2.50. "How shall we pass most swiftly from point to point, and be present always at the focus when the greatest number of vital forces unite in their finest energy? To burn always with this hard gem-like flame, to maintain this ecstasy"—that is genius. To the answering of this question, quoted from Pater in his preface, the author has devoted a series of twelve short biographies of great contemporary men in widely differing fields. Already well known for his full length biography of Bernard Shaw, this professor of mathematics at the University of North Carolina shows still further the quality of his mind by choosing for his studies Albert Einstein, Mahatma Ghandi, Thomas Edison, Benito Mussolini, G. B. Shaw, Guglielmo Marconi, Jane Addams, Orville Wright, Ignace Jan Paderewski, Marie Skladowski Curie, Henry Ford and Rudyard Kipling. The book is uneven in merit but shows a penetrating understanding.

Science News Letter, May 2, 1931

Travel

INDIA, LAND OF THE BLACK PAGODA—Lowell Thomas—*Century,* 350 p., $4. Two years' wanderings in India, winding up at the best designed and most lewdly decorated of all the thousands of temples in that land of temples. Well written and well illustrated, and spiced, as all books about India seem bound to be, with strong opinion.

Science News Letter, May 2, 1931

Mathematics

PLANE TRIGONOMETRY, WITH TABLES—W. W. Burton—*Crowell,* 218 p., $2.50. A new textbook for college use. It really consists of two books, the second part, consisting of 93 pages of logarithmic and trigonometric tables, being paged separately.

Science News Letter, May 2, 1931

Journalism

WRITING FOR PROFIT—Donald Wilhelm—*McGraw-Hill,* 385 p., $3. Guidance in newspaper work, magazine writing and selling, interviewing, publicity, advertising, verse, fiction and radio broadcasting is given. The book was conceived and promoted by a group of experienced editors and authorities whose opinions and advice are quoted liberally. The aptness of these citations compensates for the thinness with which such a large field is necessarily covered. Readers are not presumed to have college training. The proper kind of raw material should certainly profit from reading this book.

Science News Letter, May 2, 1931

Bibliography

INDUSTRIAL RESEARCH LABORATORIES OF THE UNITED STATES—Bulletin of the National Research Council, Number 81, Fourth Edition—Clarence J. West and Callie Hull—*The National Research Council,* 267 p., $2. A list of sixteen hundred laboratories gives one an astounding sense of the growth of research as a tool in industry. This represents a 60 per cent. increase over those listed in the 1927 edition. Even at that, laboratories connected with Federal, state or municipal governments, or with educational institutions have been excluded from this survey. The directors of research and their addresses are listed separately and occupy 42 pages of the Bulletin. The main list is alphabetical by name of company, but additional indices by states and laboratory activity are provided.

Science News Letter, May 2, 1931

Engineering

CIVIL ENGINEERS' ENCYCLOPEDIC DICTIONARY—Robert E. Benson—*Benson Book Co.,* 127 p., $2.50. A glossary of words, terms, and abbreviations pertaining to civil engineering and surveying, illustrated with symbols and lettering examples.

Science News Letter, May 2, 1931

Physics

ELEMENTARY ELECTRICITY — Edgar P. Slack—*McGraw-Hill,* 278 p., $2. For use in vocational and industrial schools by students who have not studied electricity before and whose mathematical training may not have gone beyond arithmetic. The treatment is based on modern electron theory and has a distinctly practical approach.

Science News Letter, May 2, 1931

Travel

AMAZON AND ANDES—K. G. Grubb—*Dial Press,* 296 p., $5. A copiously illustrated account of the author's travels and experiences in the savage parts of interior Brazil and among the peoples of the northern Andes.

Science News Letter, May 2, 1931

Anthropology

PREHISTORIC MAN—George S. Duncan—*Stratford Co., Boston,* 143 p., $2.50. A rapid-fire introduction to our forerunners on the earth. Dr. Duncan deals mostly in facts, interesting facts, the sort that the "average reader" finds surprising and illuminating. When a page or so of these essential facts have been presented on, let us say, prehistoric man's clothing, or his occupations, it is time for the next topic. The reader who has been introduced to prehistoric man by this little book will find his interest in the subject stimulated, rather than satiated.

Science News Letter, May 2, 1931

Natural History

DWELLERS OF THE SILENCES—Alexander Sprunt, Jr.—*Dodd, Mead,* 345 p., $2.50. Dramatic accounts of doings of birds and beasts of the wilderness. The author is past master of the difficult trick of individualizing his animals without personalizing them. The illustrations are by Charles Livingston Bull.

Science News Letter, May 2, 1931

Zoology-Economics

FUR—Max Bachrach—*Prentice-Hall,* 677 p., $6. This practical treatise gives adequate but non-technical natural history accounts of all the fur-bearing animals whose peltries figure in the trade, treats briefly of fur farming, and discusses the collecting, dressing and merchandising of furs. A special section on the microscopy of furs, with a large number of photomicrocraphs, will be useful not only to persons commercially interested in furs but to naturalists as well.

Science News Letter, May 2, 1931

Psychology

THE QUESTIONED CHILD — Angelo Patri—*Appleton,* 221 p., $2. Advice from an inspired teacher to other teachers, parents, and all who love children.

Science News Letter, May 2, 1931

Language

A SUMMARY OF RECORDS ON THE MODERN FOREIGN LANGUAGES—Compiled by Robert Herndon Lee—*Macmillan,* 261 p., $1. A summary issued by the Modern Foreign Language Study and the Canadian Committee on Modern Languages. It contains a general index to all the previous reports in the series to which it belongs.

Science News Letter, May 2, 1931